

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) Control device for a DC motor, ~~said motor~~ comprising:

~~a commutator having at least four sliding contacts, alternate ones of said sliding contacts forming a control group with a next following sliding contact and with a preceding sliding contact,~~

~~at least four windings connectable to said at least four sliding contacts such that each of said windings is arranged between subsequent sliding contacts,~~

~~a modulation stage generating control signals modulated as to pulse width with a clock frequency substantially above motor speed, and~~

~~a control circuit controlled by at least one control signal and having at least two load branches each being provided with an electronic switch controlled by one of the control signals modulated as to pulse width, each of said load branches being associated with one of said control groups for feeding the windings associated with the sliding contacts of said one control group~~

a modulation stage generating control signals modulated as to pulse width with a clock frequency substantially above motor speed, and

a control circuit controlled by at least one control signal and having at least two load branches, each of said load branches being provided with an electronic switch controlled by one of the control signals modulated as to pulse width,

a commutator having at least four sliding contacts,

at least four windings, each of said windings being commutatively arranged between one of said sliding contacts and a next following sliding contact, alternate ones of said sliding contacts forming a respective control group with a next following sliding contact and with a

preceding sliding contact,

each of said load branches being associated with one of said control groups for controlling power feed to the windings associated with said respective one control group via the sliding contacts of said respective control group.

2. (Previously presented) Control device as defined in claim 1, wherein each load branch comprises a freewheeling component and an electronic switch connected in series to the pairs of sliding contacts.
3. (Original) Control device as defined in claim 1, wherein the modulation stage generates a separate control signal modulated as to pulse width for each of the load branches.
4. (Previously presented) Control device as defined in claim 1, wherein the control signals have the same period duration.
5. (Previously presented) Control device as defined in claim 1, wherein the control signals have an identical pulse width modulation for the load branches.
6. (Previously presented) Control device as defined in claim 1, wherein the control signals are phase-locked in relation to one another.
7. (Previously presented) Control device as defined in claim 3, wherein the control signals are shifted in phase relative to one another.
8. (Previously presented) Control device as defined in claim 1, wherein a switch-on time period of one of the load branches and a switch-off time period of the other one of the load branches are predetermined relative to one another and that a time interval between the switch-on time period

of the one of the load branches and a switch-on time period of the other one of the load branches varies in accordance with the value of the PWM ratio to be set.

9. (Original) Control device as defined in claim 1, wherein a control of the at least two load branches is brought about such that one of the load branches is switched on when the other one of the load branches is switched off.

10. (Original) Control device as defined in claim 1, wherein in a first operating range each of the load branches is switched on only when the respectively other one of the load branches is switched off.

11. (Original) Control device as defined in claim 10, wherein in the first operating range each of the load branches is switched off with a gap in time prior to any switching on of the respectively other one of the load branches.

12. (Previously presented) Control device as defined in claim 11, wherein in the first operating range a minimum period of time of 0.5 % of a period duration is provided between the switching off of each of the load branches and the switching on of the respectively other one of the load branches.

13. (Previously presented) Control device as defined in claim 10, wherein in the first operating range a switch-on time period of the one load branch and a switch-off time period of the other load branch vary.

14. (Previously presented) Control device as defined in claim 1, wherein in a second operating range one of the load branches is switched on only during a switching off or after the switching off of the other one of the load branches.

15. (Previously presented) Control device for DC motors comprising:

a commutator for feeding motor windings of said DC motor, said commutator having at least four sliding contacts, the sliding contacts being combined to form at least two control groups, the sliding contacts being combined within each control group to form pairs of sliding contacts fed in parallel,

a modulation stage generating at least one control signal modulated as to pulse width with a clock frequency substantially above a motor speed, and

a control circuit controlled by the at least one control signal and having at least two load branches, each load branch being provided with an electronic switch controlled by the control signal modulated as to pulse width and feeding in parallel said pairs of sliding contacts of one of said control groups, said control circuit operating in a first and a second operating range,

wherein in the second operating range each of the load branches is switched on after a switching on and prior to a switching off of the respectively other one of the load branches.

16. (Previously presented) Control device as defined in claim 1, wherein the control circuit has a capacitor arranged on a supply side of the load branches.

17. (Previously presented) Control device for DC motors comprising:

a commutator for feeding motor windings of said DC motor, said commutator having at least four sliding contacts, the sliding contacts being combined to form at least two control groups, the sliding contacts being combined within each control group to form pairs of sliding contacts fed in parallel,

a modulation stage generating at least one control signal modulated as to pulse width with a clock frequency substantially above a motor speed, and

a control circuit controlled by the at least one control signal and having at least two load branches, each load branch being provided with an electronic switch controlled by the control signal modulated as to pulse width and a freewheeling component, in each of the load branches the electronic switch is located between a first connection of the pairs of sliding contacts of a

respective control group and a first voltage connection, and a second connection of the pairs of sliding contacts of the respective control group is in communication with a second voltage connection,

a freewheeling branch having as series connection a capacitor connected to the first voltage connection and an inductor connected to the second connection of the pairs of sliding contacts, the freewheeling component located between a central tap between the capacitor and the inductor of the freewheeling branch and the first connection of the pairs of sliding contacts, said freewheeling branch enabling a freewheeling current of the motor winding associated with the pairs of sliding contacts of the respective control group flowing via said freewheeling component when the electronic switch is opened.

18. (Original) Control device as defined in claim 17, wherein at least two load branches are connected in parallel to the one freewheeling branch.

19. (Original) Control device as defined in claim 18, wherein the at least two load branches are connected in parallel to the freewheeling branch in the same way.

20. (Previously presented) Control device as defined in claim 17, wherein the at least two load branches have the same circuitry configuration.

21. (Original) Control device as defined in claim 17, wherein a first connection of the capacitor of the freewheeling branch is connected to a first connection of the electronic switch by means of a line having an inductance of less than 50 nano henry.

22. (Previously presented) Control device as defined in claim 17, wherein a second connection of the capacitor of the freewheeling branch is connected to the respective freewheeling component with a line having an inductance of less than 50 nano henry.

23. (Previously presented) Control device as defined in claim 17, wherein a product of a value of the inductor and a value of the capacitor in the freewheeling branch is greater than a square of a cycle time of the control signals modulated as to pulse width.

24. (Previously presented) Control device as defined in claim 17, wherein the value of the capacitor of the freewheeling branch is greater than a product of a maximum value of the current through an inductive load located between the respective pairs of sliding contacts with a ten-fold cycle time, divided by a voltage between a supply voltage connection and a ground connection.

25. (New) Control device for a DC motor, comprising:

- a commutator for feeding motor windings, said commutator having at least four sliding contacts,

- at least four windings connected to said commutator such that each of said windings is commutatively arranged between a pair of successively arranged sliding contacts,

- a modulation stage generating control signals modulated as to pulse width with a clock frequency substantially above motor speed, and

- a control circuit controlled by at least one control signal and having at least two load branches, each load branch being provided with an electronic switch controlled by one of the control signals modulated as to pulse width, and each of said load branches being associated with said commutator for feeding power to a respective control group formed by two subsequent pairs of sliding contacts, with one sliding contact being a member of each of the two subsequent pairs of sliding contacts, each load branch feeding the windings connected to one of said respective control groups.

26. (New) Control device for a DC motor comprising:

- a commutator for feeding motor windings, said commutator having at least four sliding contacts,

- at least four windings connected to said commutator such that each of said windings is

commutatively arranged between one of said sliding contacts and a successively arranged sliding contact,

a modulation stage generating control signals modulated as to pulse width with a clock frequency substantially above the motor speed, and

a control circuit controlled by at least one control signal and having at least two load branches each being provided with an electronic switch controlled by one of the control signals modulated as to pulse width, each of said load branches being connected to said commutator such that one of said sliding contacts is connected to one of said load branches and respective alternate ones of said sliding contacts are connected to respective other load branches for feeding said windings connected to said load branches via said sliding contacts of said commutator.